

UK Weather: How stormy has it been and why?

Description

Since the start of December the UK has seen a prolonged period of particularly unsettled weather, with a series of storms tracking in off the Atlantic bringing strong winds and heavy rain.

The windiest month since 1993

In order to compare the recent spell with the numerous stormy periods of weather in the past the Met Office's National Climate Information Centre has done an analysis of the number of weather stations in the UK which have registered winds over certain thresholds since the start of December.

This measure suggests that December 2013 is the stormiest December in records dating back to 1969 and is one of the windiest calendar months for the UK since January 1993.

December was also a very wet month across the UK, particularly in Scotland where it was the wettest December and wettest month overall in the records dating back to 1910.

But why has this been the case?

Storms are expected in winter

First of all, we do generally expect to see stormy conditions in winter months. This is because we see a particularly big difference in temperature between the cold air in the Arctic and the warm air in the tropics at this time of year.

This contrast in temperatures means we see a strong jet stream, which is a narrow band of fast moving winds high up in the atmosphere.

The jet stream can guide storms as they come across the Atlantic, and it has been sitting in the right place to bring those storms to the UK over the past few weeks.

There's also a close link between the jet stream and storms. The jet stream can add to the strength of storms, but then storms can also increase the strength of the jet stream. This positive feedback means storms can often cluster together over a period of time.

But why has it been particularly stormy?

Even accounting for the fact that it's winter, the jet stream has been particularly strong over the past few weeks – but why is this the case?

It's partly due to particularly warm and cold air being squeezed together in the mid-latitudes, where the UK sits. This could be due to nothing more than the natural variability which governs Atlantic weather.

However, looking at the broader picture, there is one factor which could increase the risk of a stormy

start to winter and this is called the quasi-biennial oscillation (QBO for short).

This is a cycle, discovered by the Met Office in 1959, which involves a narrow band of fast moving winds (much like our jet stream) which sits about 15 miles up over the equator. The cycle sees these winds flip from easterly to westerly roughly every 14 months.

In 1975 Met Office researchers discovered that when the QBO is in its westerly phase, it tends to increase the westerlies in our own jet stream – meaning there's a higher risk of a stronger, more persistent jet stream with more vigorous Atlantic storms. It has been in its westerly phase since early 2013 and we expect it to decline over the next few months.

This is just one factor among many, however, which needs to be considered – so it doesn't mean that the westerly phase of the QBO will always bring us stormy winters.

What about climate change?

Climate models provide a broad range of projections about changes in storm track and frequency of storms. While there's currently no evidence to suggest that the UK is increasing in storminess, this is an active area of research under the national climate capability.

Date Created

January 2014

What is causing the extreme cold over North America?

Description

The weather over North America has been hitting the headlines over the last few days with record breaking cold conditions spreading south from the Arctic. This has been linked to a 'polar vortex', but what is this and what could it mean for the UK?

What is the Polar Vortex?

The Polar Vortex is a term normally used to describe the persistent large-scale low pressure area situated around 50km above the poles in the stratosphere. When the vortex breaks down the eastern US is often cold, but this breakdown hasn't happened yet. It is not clear to what extent the Polar Vortex is influencing surface weather at the moment.

What is happening over the USA?

The American use of the phrase 'polar vortex' referring to the extremely cold conditions over North America is slightly different to traditional definition above. It refers to features lower in the atmosphere – in the troposphere, where our weather happens.

In the winter a deep reservoir of cold air becomes established through the atmosphere over the Arctic because of the lack of sunlight. This is usually held over high latitudes by the [jet stream](#).

What is happening over North America is that the jet stream has weakened and moved southwards in the wake of a low pressure system as it moved east over the Atlantic. This allowed the reservoir of cold air to move southwards across the US, resulting in extremely low temperatures.

What does it mean for the UK? Does it mean it will get cold here?

Not at the moment. We get our coldest weather in the winter when the winds blow from the northeast or east – so from the continent.

In fact the cold weather in the US can strengthen the jet stream and bring the UK milder and wetter weather, much as we have seen over the last few days.

Currently our winds are blowing from the [west](#) and, while we will see the temperatures dropping from the mild conditions we have had during December, they will only be returning to something much closer to normal for the time of year.

Date Created

January 2014

Mild wet winter continues in early January figures

Description

Provisional half-month statistics up to the 15th of January show a continuation of the generally mild and wet theme of the UK's winter thus far.

The mean UK temperature up to the 15th of January is 5.1 °C, which is 1.5 °C above the long-term (1981-2010) average.

The mild January so far follows on from a mild UK December, which had a mean temperature of 5.7 °C, which is 1.8 °C above the long-term average – making it the eighth mildest December in records dating back to 1910, and the mildest since 1988.

It's a similar story with UK rainfall. We'd normally expect about 48% of the January average rainfall by the 15th of the month, but the UK has seen 87.9mm so far – which equates to 72% of the January average.

As usual, there are regional variations. England has been particularly wet so far this month, having already seen close to its full-month average, and Wales is not too far behind. Scotland and Northern Ireland, however, are closer to the 'normal' amount of rain we'd expect at this stage.

The wet January so far once again follows the theme set in December, which saw 184.7mm of rain – which is 154% of the average for the month.

While this means January, and winter, so far have been mild and wet, it doesn't mean they will finish that way. We often see half-month or half-season figures which then change dramatically by the end of the period. So the message is, it's too early to judge how January 2014 or winter 2013/4 will finish up.

The main reason for the mild and wet weather so far is that we have seen a predominance of west and south-west winds, bringing in mild air from the Atlantic – as well as generally unsettled conditions.

The table below shows provisional figures from 1-15 of January, with actual figures so far compared to full-month averages. We would normally expect rainfall and sunshine to be about 48% of the full-month average at this stage.

January 1-15	Mean Temperature		Sunshine hours		Rainfall	
	Actual	Diff from Avg	Actual	% of Avg	Actual	% of Avg
	degC	degC	hours	%	mm	%
UK	5.1	1.5	26.1	55	87.9	72
England	6.0	1.9	34.7	64	80.4	97
Wales	5.8	1.7	20.6	42	137.7	88
Scotland	3.6	1.0	15.4	43	91.2	51

N Ireland	4.4	0.2	14.6	33	62.8	54
Date Created						
January 2014						

December weather summary

Description

December saw some settled weather but also some stormy periods. A major winter storm on 5th brought strong winds to Scotland with a storm-surge mainly affecting the east coast. A succession of deep Atlantic low pressure systems brought heavy rain and very strong winds for most areas, with frequent gusts of 60 to 70 mph. This was the windiest December in records from 1969 and one of the windiest calendar months since January 1993. On Christmas Eve a mean-sea-level-pressure of 936 hPa was recorded at Stornoway (Western Isles), the lowest such value at a UK land station for many years.

The UK mean temperature was 5.7 °C, which is 1.8 °C above the 1981-2010 average, provisionally the warmest December since 1988. The UK overall received 154% of average rainfall and Scotland had its wettest December in a series from 1910. There was provisionally 108% of the long-term average hours of bright sunshine, with western areas rather dull but central and eastern England much sunnier than average. Visit our [climate section](#) for a full written summary of the month.

Your pictures

Thank you for sharing your pictures of December weather on [Twitter](#). Here are some of our favourites...

[@metoffice](#) Taken by [@photography_jmj](#) during the recent storms and high tides at Meadfoot Beach, Torquay [#storms pic.twitter.com/uYgEtmefLr](#)

— JMJPhotography (@photography_jmj) [January 10, 2014](#)

[@metoffice](#) Sunset over Coventry [pic.twitter.com/fb7L1xpFyq](#)

— Trevor sutton (@Trevorsutton71) [January 10, 2014](#)

[@metoffice](#) jack frost in stalbans [pic.twitter.com/1zP0uhe7iP](#)

— Jon h (@67jrde) [January 10, 2014](#)

[@metoffice](#) early morning around 17th December [@WalesCoastPath](#) in Flint looking towards Flintshire bridge [pic.twitter.com/LAFvfftAU8](#)

— Angela Thomas (@AMcKT) [January 10, 2014](#)

[@metoffice](#) pic.twitter.com/lqBs8FJG5x

— Stacy Simpson (@StacySimpson82) [January 10, 2014](#)

[@metoffice](#) Flooding on North Shields Fish Quay, North Tyneside.
pic.twitter.com/6o7g1gVTCU

— Christian Cerisola (@ChristianCeriso) [January 10, 2014](#)

Date Created

January 2014

Coldfinger – The power of weather in context for marketing and advertising

Description

Terry Makewell, the Head of Digital & Global Media at the Met Office details how we are seeing not just the next stage of contextual advertising but the emergence of an era where the agency takes further control of Return on Investment (ROI)

This morning the Met Office and The Weather Channel Ltd. introduced weather as an advertising category to brands and media agency executives at the Century Club in London.

As Britons we feel like we own weather. We live with it every day. It is a national obsession. The rain soaks our clothes and, more blissfully, the sun warms our skin. When people think of the weather they think of the Met Office.

We are the UK's foremost supplier of weather information and services. Our forecasts feed into thousands of systems across the UK and the World from aeroplanes to financial systems. Through our commercial remit as a government trading fund we offer advertising across our digital platforms which represents the largest reach in the UK weather market for advertisers.

We are at the cutting edge of climate and weather science with awards for social media, digital marketing and our ground breaking weather app. We're extremely good at what we do.

Recently the [Sunday Telegraph](#) described our forecasting operations room as being 'like the set of a James Bond movie with countless screens displaying the weather secrets of the world'. It certainly is an impressive sight to behold, but I must admit that I haven't seen Honor Blackman walking around recently. But if she had been she would have seen our 24/7 operations centre tweeting to any one of our near 200,000 followers on Twitter who wish to receive a personalised response and forecast. Weather never sleeps and neither do we.

Now this is where it gets really interesting. The national obsession with the weather means that the always connected customer is constantly accessing our content, viewing our videos and checking out their local forecasts – we are getting towards an average of 100 million UK page impressions on our [website](#) per month. All this combines to produce a very strong proposition for brands. Being able to deliver campaigns directly into the hands of 45% of all UK smart phone users (via our award winning mobile app) has provided a powerful leverage for some very large brands who have worked with us.

Through advertising across all of our digital propositions we are able to deliver tangible results by putting these adverts into context. Campaigns can be targeted to locations and to weather conditions. You can target a holiday campaign in Hull tomorrow because you know it'll be raining, or push a Ferrari campaign to the Manchester United players by targeting certain villages in the Cheshire countryside because it'll be sunny.

The old adage of Content is King has been around for a long while, but now weather in context is fast becoming king. We have seen amazing ROI for our advertisers who follow this contextual approach.

Weather provides us with a virtuous circle of returning customers.

So, while we can offer unequalled access to weather focused customers via our digital propositions we can also pass over this control. For anyone in the agency world there is always the question of how can I prove to my clients that they are getting value for money? To help answer this we are now allowing agencies direct access to our GoldenEye-esq operations centre via our Weather Windows™ product. This product allows agencies to utilise any of the Met Office's unparalleled forecasts in an automated fashion by integrating these with their internal systems.

This is a powerful proposition since agencies can now target according to weather across an entire campaign, no matter where the adverts are being displayed. They make this call. This forecast can suit whatever variables the agency wishes to choose. Through this insight, it is possible to integrate weather into further campaign activities such as e-shots and non-digital displays. When you know it's going to be sunny in Leith tomorrow you can push out that e-shot to customers in that geographic area and see those conversion rates soar!

Agencies can also use Weather Windows™ when working directly with brands to contextualise their own portfolios. Why not see where in the country someone is viewing a DIY website from, correlate this against the weather and then change the content to reflect this? If it's raining then promote painting and internal products, but if it is sunny then push outside equipment such as sheds and lawnmowers.

Weather influences everything we do and Weather Windows™ provides the business intelligence to empower agencies and brands to contextually target the customer.

Weather knowledge is not only power, whether directed through the Met Office channel or through in-house methods. Weather knowledge is also profit.

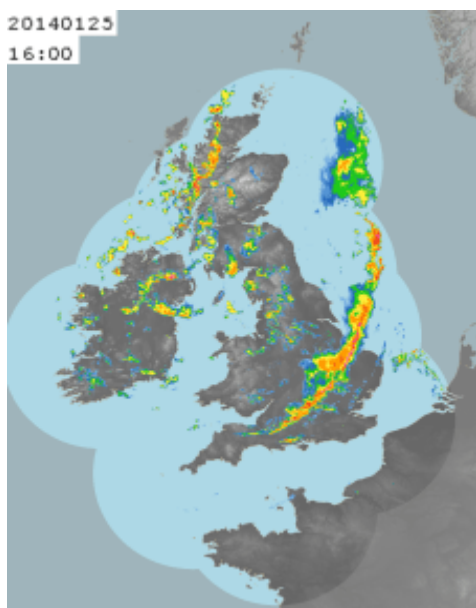
Ross Webster, managing director EMEA, The Weather Channel discusses the value of big weather data in advertising [here](#).

Date Created
January 2014

Saturday's squally weather and reports of tornadoes

Description

On Saturday we saw a number of heavy rain showers group together in what's known as a 'squall line' – a narrow band of thunderstorms, intense rain, hail, and frequent lightning accompanied by brief but very strong gusts of wind and possibly tornadoes.



Radar image showing the narrow band of showers moving across the UK.

This squall line swept across Wales and then moved south east across southern parts of England – bringing about 6mm of rain to places in a very short period of time with gusts of wind of around 60mph or more in places.

It also had the characteristics of a cold front, with the temperature ahead of it being around 11°C, falling to 7°C once the squall line had passed.

There have been reports of possible weak tornadoes from some locations, however it's hard to verify them without pictures or footage because these features are generally too small to be picked up by satellites or weather observation equipment.

It's also worth noting that squally winds can often be mistaken for tornadoes because these gusts can be sudden and strong – potentially causing very localised damage.

You can see more information on [tornadoes](#) and [how they form](#) on our website.

Date Created

January 2014

The 2013 global mean temperature

Description

In December 2013 we [published](#) an estimate of the global mean temperature up to the end of October 2013, based on an average of the three main global temperature datasets – Met Office and University of East Anglia (HadCRUT4), NOAA National Climatic Data Center (NOAA NCDC) and NASA Goddard Institute of Space Studies (NASA GISS).

The United Nations' World Meteorological Organisation (WMO) and the IPCC's provisional estimate global mean temperature for 2013 is $0.5\text{ °C} \pm 0.1\text{ °C}$ above the long-term (1961-1990) average.

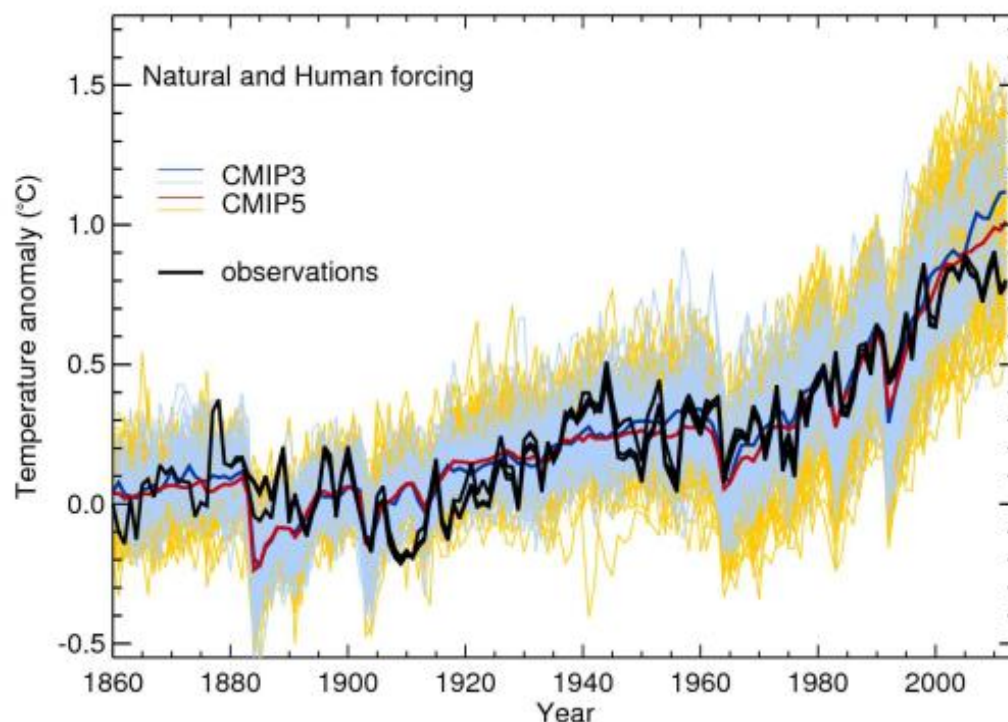
For HadCRUT4, the provisional estimate for the whole of 2013 is between 0.39 °C and 0.59 °C above the long-term (1961-1990) average of 14.0 °C , with a central estimate of 0.49 °C .

This means 2013 is in the top ten warmest years on record and we continue to see near record global temperatures like those which resulted in 2000-2009 being the warmest decade in the instrumental record.

As always the latest figure has generated [interest](#) in the media, which focuses on how it relates to previous forecasts from the Met Office.

The global mean temperature is just one of many indicators – including sea level rise, shrinking glaciers and reducing Arctic sea ice – that give even more confidence that the world is warming. Climate models are an invaluable tool in helping us to understand past changes and predict how temperatures may change in the future; they have provided overall good advice capturing and representing the warmer world we now live in.

We can see from the IPCC AR5 report figure below how global temperatures have risen since 1860 and how the latest provisional observational estimates still lie within the range of the forecast models. This figure also shows that, looking back over the entire observational record there are a number of occasions where the observations lie close to both the upper and lower bounds of the model simulations, so what we are seeing at the moment is nothing new.



Time series of global and annual-averaged surface temperature change from 1860 to 2012 showing results from two ensemble of climate models driven with natural forcings and human-induced changes in greenhouse gases and aerosols compared to observations of global mean temperature from three different datasets relative to 1880-1919. CMIP3 relates to the suite of climate models used in IPCC AR4 and CMIP5 those models used in IPCC AR5.*

So, why might the global mean temperature be different from forecasts? Well, we know that, due to the lack of long-term observing sites in polar latitudes, HadCRUT4 underestimates the contribution from Arctic warming which has accelerated in recent years.

There is also increasing scientific evidence that the current pause in surface warming is associated with natural variability in the global oceans, as they absorb heat from the atmosphere. Changes in the exchange of heat between the upper and deep ocean appear to have caused at least part of the pause in surface warming, and observations suggest that the Pacific Ocean may play a key role. You can find out more about the recent pause in warming [here](#).

*Figure modified from Bindoff, N. L., P. A. Stott, K. M. AchutaRao, M. R. Allen, N. Gillett, D. Gutzler, K. Hansingo, G. Hegerl, Y. Hu, S. Jain, I. I. Mokhov, J. Overland, J. Perlwitz, R. Sebbari and X. Zhang, 2013: Detection and Attribution of Climate Change: from Global to Regional. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T. F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P. M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, in press.

Date Created

January 2014